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Soil Moisture Situation 1957

Gerald L. Barger
Iowa State College

Robert H. Shaw
Iowa State College

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Your "bank account" of soil moisture can't be "overdrawn"—nature won't advance the funds. Your account for 1957 crops depends on the current balance plus any amount of moisture added, absorbed and held.

by Gerald L. Barger and Robert H. Shaw

THE TERM "soil bank" has a very real meaning when we think about the 1957 corn crop. We can't "overdraw" our soil moisture account — nature just won't advance funds. But our balance can be reduced to near zero during dry seasons such as 1956.

What We Have . . .

Better Iowa soils have a capacity of 8 to 12 inches of water available to plants in the top 5 feet. On Nov. 1, 1956, according to 20 locations sampled, available soil moisture varied from less than 25 percent to more than 50 percent of capacity. The western and southern three-fifths of the state was at 25 percent of capacity or less, as shown in map 1. In northeastern Iowa, the water stored was 25 to 50 percent of capacity. In some east-central counties 50 percent or more was available on Nov. 1.

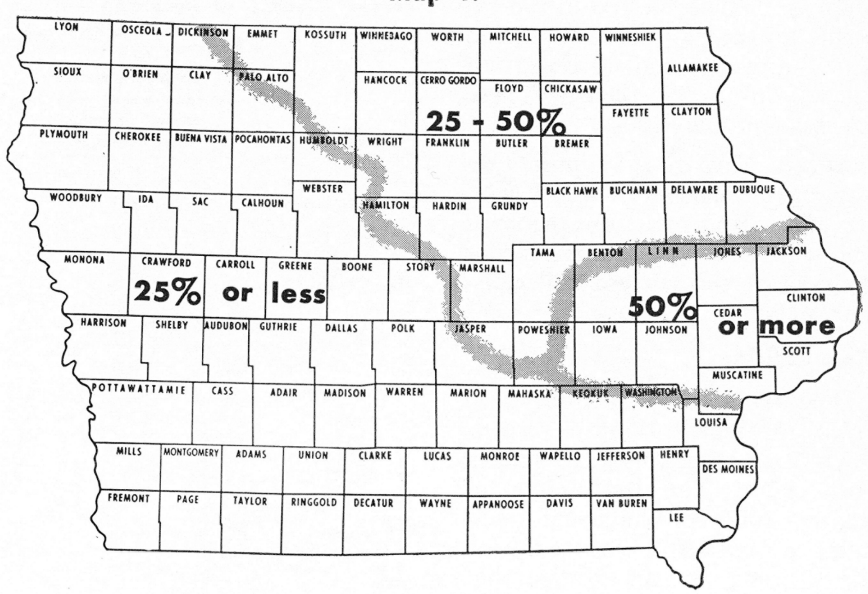
We believe 50 percent of capacity is somewhere near normal for Iowa at the time of the fall samplings.

The dividing zones as drawn in map 1 are used only to mark off general areas of soil moisture. We don't have the data to locate these zones exactly. In general, however, we can say that on Nov. 1, there was something like 2 to 6 inches of available water in the surface 5 feet of soil for the start of our 1957 account.

What Can We Get?

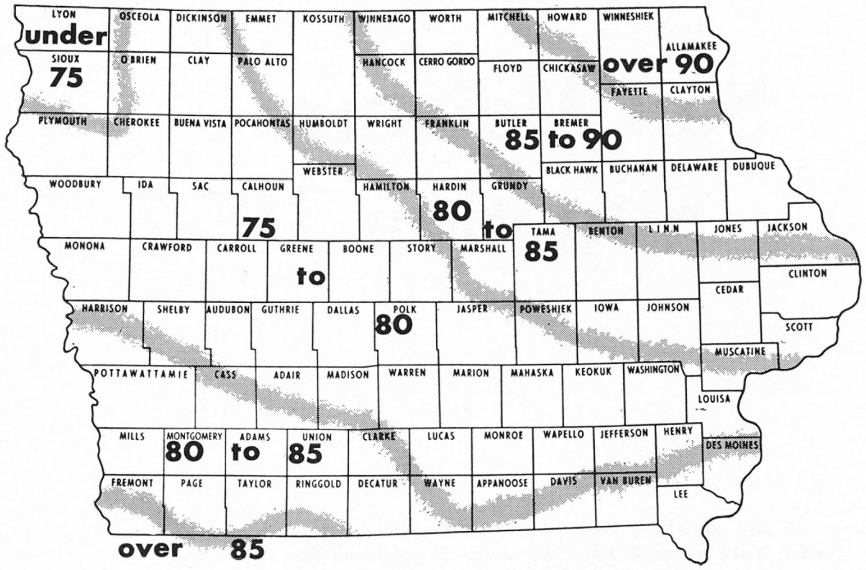
Now what can we expect from the sky? Normal total rainfall in Iowa for the period, Nov. 1 through April 30, is about 7 to 9 inches. But there's appreciable evaporation in November and April and also smaller losses throughout the winter. Couple this with the fact that frozen soil doesn't absorb water rapidly, and you can see why we can't expect too much of an increase in soil

Map 1.



GERALD L. BARGER is associate professor of agricultural climatology and area climatologist, U. S. Department of Commerce. ROBERT H. SHAW is associate professor in charge of agricultural climatology.

Map 2.



moisture from winter precipitation.

In the last year or two, for example, near-normal winter precipitation hasn't changed the previous fall's soil moisture picture much by corn planting time. In other words, we still have to depend on late spring and summer rainfall as a supplement to the water already stored in the soil last November.

Now look at map 2. Under usual soil moisture conditions in the spring, 11 inches of rainfall between May 17 and September 5 is just barely enough to support an average corn crop in Iowa. This is an average minimum supply, not an optimum or ideal amount for top yields. The odds of getting 11 inches or more range from 75 chances in 100 in the extreme northwest—to 85 in 100 in the southwest—and 90 times out of 100 in the northeast. These are high probabilities.

But in May of 1957, unless we have better than normal fall, winter and spring moisture, many of you will need more than 11 inches because of the current soil-moisture deficit.

The Odds . . .

The table lists 13 counties in Iowa for which rainfall records have been studied in relation with corn yields. The first column of figures indicates the usual minimum rainfall requirements during the growing season. Notice that these amounts range from about 8 inches up to nearly 13—depending on the soil and location involved. In column 2 you see the chances of receiving these amounts. They range from 62 chances in 100 (i.e., 62 percent) in Crawford County to 92 chances in 100 (92 percent) in Linn County. The other four columns in the table give you the odds of receiving the amount of rainfall in the first column *plus* an *additional* 2, 4, 6 and 8 inches, respectively.

Say your soil is 4 inches below the usual storage amount in May and you live in Hamilton County. Ordinarily you'd need 10.4 inches of rainfall. But with a 4-inch deficit, you need about 14.4 inches. The chances of receiving this amount between mid-May and early September are 37 percent, or 37 years out of 100 you could expect to get more than 14.4 inches of rainfall.

These are the odds right now on your getting an average corn yield next summer *if* you have a 4-inch soil moisture deficit at planting time. If you're only 2 inches below the usual supply, your chances would be 56 percent. But if you need an extra 6 or 8 inches, the odds drop to 20 percent and 11 percent, respectively, and these are poor risks indeed.

In 1956 several places in southwestern and south-central Iowa did need 4 to 8 inches of additional rainfall during midsummer to produce an average crop. Fortunately many of these places received excesses sufficient to make up at least a good portion of this deficit. This could happen again in 1957.

We are confident, however, that it won't happen in more than 3 to 6 years out of 10 and—more certainly—not more than in 30 to 60 years out of 100. The longer the period of time, the more reliable are the probability figures which we've given you. For any one year, they may turn out wrong. Over the long pull, however, and if you make your plans according to the chances outlined in the table, you should be money ahead. We'll have more up-to-date soil moisture information for you as planting time approaches.

Percent Chance of Receiving Varying Amounts of Total Rainfall During the 16 Weeks, May 17 through Sept. 5.

County	Minimum rainfall requirement with normal soil moisture storage[a]	Chances of receiving the following: Minimum requirement only	Minimum plus: 2"	4"	6"	8"
Lyon	8.2	87%	74%	54%	36%	21%
Cerro Gordo	12.3	72	53	36	19	11
Fayette	12.8	68	47	29	17	9
Crawford	12.0	62	43	27	17	8
Hamilton	10.4	76	56	37	20	11
Story	8.6	90	76	59	43	31
Marshall	9.1	89	75	58	41	27
Linn	8.9	92	77	58	37	22
Page	9.3	90	79	64	48	33
Ringgold	10.9	83	69	53	38	27
Wayne	12.4	64	47	35	23	16
Washington	8.9	87	73	58	43	29
Jefferson	12.2	67	52	38	26	18

[a]These values are based on 50 years of rainfall records and county average corn yields (adjusted to hybrid corn levels) taking soil moisture as it happened to occur each year. Usually each amount is barely sufficient to produce an average corn crop in the county shown. Dry subsoil requires larger amounts of seasonal rainfall.